

Space Weather Forecast

Issued on Sunday, 11 September 2022 at 01:21 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Possible minor geomagnetic activity midweek.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has remained low over the past 24 hours, with X-ray activity again displaying occasional low-end common-class flares. These flares peaked at 10/1119UTC, with the spot responsible seeing growth in its leading portion. This was one of eight sunspot groups on the Sun in the period, with two main other regions of note showing growth in the period. One near the centre of the facing side showed proliferation across a wide latitudinal span, while the second grew rapidly in the northwest. All of the remaining regions were either (apparently) magnetically unipolar, else simple or decaying dipoles.

There remain many large 'filaments' (arcs of plasma) scattered across the Sun. One such filament disappeared from the northern central solar hemisphere around 10/1930UTC, as shown in ground-based near-infrared imagery. This event is not yet visible in satellite imagery, however could well have an Earth-directed component should it have the impetus to leave the immediate solar environment. The only event that did appear at the time of writing was a low-latitude CME, with this analysed and not expected to affect Earth (passing well below and behind the track of the Earth in its orbit). In the UTC evening, a high latitude northwestern solar horizon 'prominence' (arc of plasma on the Sun's edge) also became visible, however Earth-based effects are again not expected from this location.

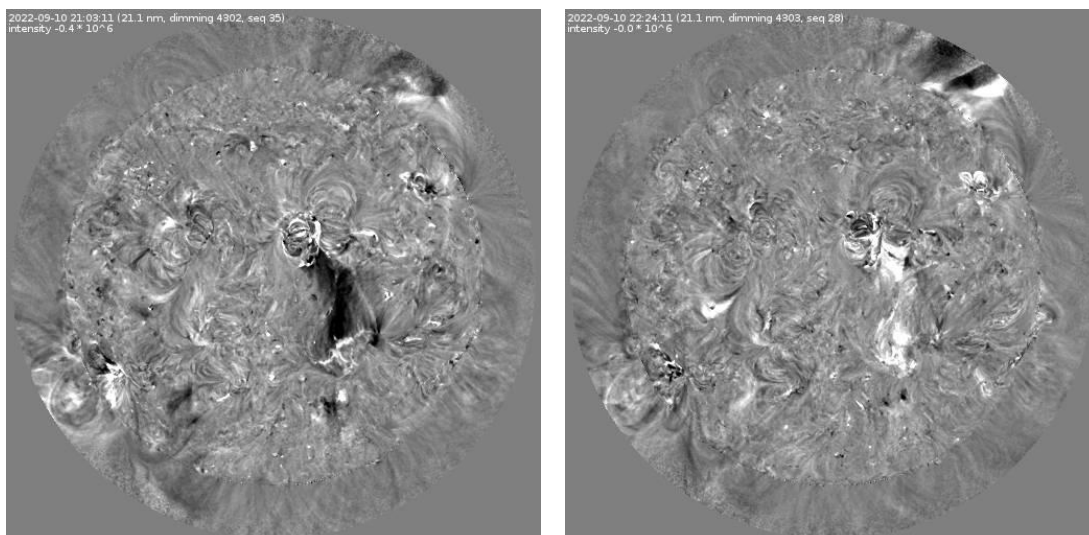


Figure 1: Time-integrated extreme UV imagery of a central dimming from a disappearing filament (left) and northwestern prominence (right). Any ejecta from the filament is not yet visible as a CME, but will be analysed should it appear. Image processing courtesy of SIDC ROB.

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All considered, no new Coronal Mass Ejections (CMEs) have been confirmed, however ejecta from the 10/1930UTC event is awaited for analysis.

Solar Wind / Geomagnetic Activity: The solar wind was indicative of a slight resurgence of a fast wind regime, perhaps indicating passing from one 'coronal hole' high speed stream to another.

The solar wind speed rose over the 24 hours through slightly elevated levels. The number of particles comprising the solar wind was within long-term background levels, as was the associated magnetic field. The north-south component of this field was however often anti-aligned with the Earth's field to greater effect.

The net result of the above solar wind measures was below Minor Geomagnetic Storm G1 throughout.

Energetic Particles / Solar Radiation: While there were no solar radiation storms, the recorded level was slightly above its characteristic background trace, with 10MeV protons peaking near 1pfu before decreasing slightly by the end of the 24 hours.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be low, but with a slightly increased slight chance of rising to moderate with isolated moderate-class flares, mainly as a result of the potential return of a previously active sunspot group over the southeastern solar horizon in the first 36 hours.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast carries low confidence. The tail of the current fast wind should soon fade to leave mainly quiet conditions into the start of the new working week. Confidence falls further from later Tuesday 13 September, whereupon there is a risk of another fast wind and perhaps the 09 September CME arriving, with both more likely midweek, giving a slight chance of Minor Storm G1.

The above forecast does not include any contribution from the 'disappearing filament' seen 10/1930UTC, with this yet to be analysed.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	1	5	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	10	10	10	10
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)